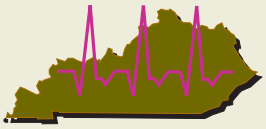


EQC

Environmental Quality Commission
Environmental Indicators Program
Reporting on Environmental Trends and Conditions in Kentucky.

1996 Trends Reports
- Safe Drinking Water
- Air Quality
- Waste Management
- Toxics
- Water Quality
- Natural Resources
- Resource Extraction

EQC is a seven-member citizen commission created under state law with a mission to monitor environmental trends and conditions, promote partnerships to improve and protect the environment, provide a public forum for the discussion of environmental issues, and advise state officials on environmental matters.

Toxics

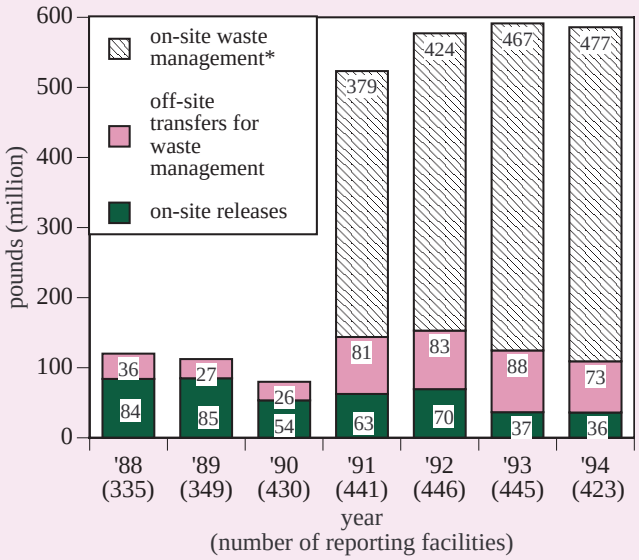
Every day, the typical person comes in contact with some of the 70,000 chemicals registered for commercial use — from household cleansers used in our homes to the gasoline we put in our cars.[1] Nearly six trillion pounds of these chemicals are produced each year.[2] The potential public health and environmental risks posed by industrial and other chemicals used in society are just beginning to be understood. However, most have not been tested to determine their short- and long-term effects or combined effects on people, wildlife, and ecosystems.[3] And new chemical threats are discovered each year. For example, in 1996 after testing imported vinyl mini-blinds, the U.S. Consumer Product Safety Commission alerted the public that these blinds present a lead poisoning hazard for young children.

This *State of Kentucky's Environment Report* reviews the risks posed by toxic chemicals. The report includes information on the generation and release of industrial toxic chemicals to the environment, pollution prevention trends, agricultural and lawn-care chemical-use trends, and toxics in the home.

Industrial Toxic Chemicals

Industrial toxic chemical wastes are produced as by-products of the manufacturing process. One source of data to measure industrial toxic generation and emissions is the Toxic Release Inventory (TRI). The inventory was established in 1988 as part of the federal Emergency Planning and Community Right-to-Know Act of 1986. The act requires certain large manufacturers to self-report to the public the amount of more than 300 toxic chemicals generated, disposed in landfills, released to the air or water, or otherwise managed on- or off-site.[4] (The TRI list was recently increased to more than 600 chemicals for reporting year 1995.)

Figure 1 Generation of Toxic Chemicals in KY

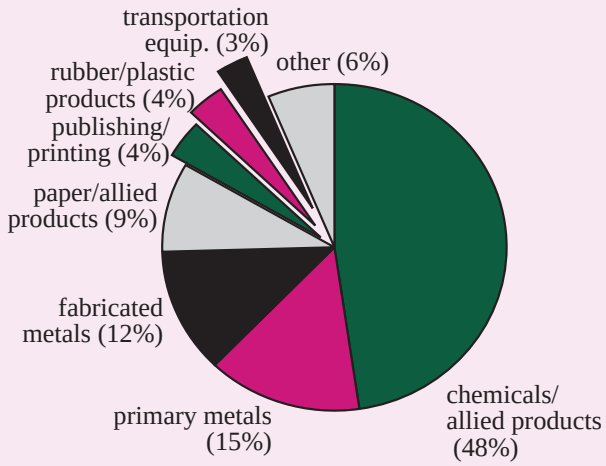


*Note: Previous yearly totals are not adjusted for newly added or deleted chemicals. Data not required to be reported on recycling and energy recovery for 1988-1990. *On-site category was added in 1991 and includes chemicals generated, treated, and recovered at the site of generation.*
Source: Toxic Release Inventory Reports

585 Million Pounds of Toxics Generated During 1994 in KY

In 1994, the most recent year which data is available, 22,744 facilities in the U.S. reported generating 6.13 billion pounds of toxic chemicals. In Kentucky, 423 industrial facilities reported generating 585.8 million pounds of TRI chemicals that year **(Figure 1)**. This amounts to 154 pounds of toxic

Figure 2 Major Generators of TRI Toxic Chemicals in Kentucky (1994)



Note: Based on the generation of 585.8 million pounds of toxic chemicals by those KY manufacturers required to report under the federal TRI. Source: Toxic Release Inventory Report

In 1994, the most recent year which data is available, 423 industrial facilities in Kentucky reported generating 585.8 million pounds of TRI chemicals. This amounts to 154 pounds of toxic chemicals for every Kentuckian. The major generators of TRI chemicals in the state are the chemical, primary and fabricated metals, and paper/allied products industry.

Some areas of the state have a larger concentration of industry and thus a greater burden and potential environmental or health risks from toxics. Eight counties accounted for 68% of the toxic chemical releases in 1994 (Ballard, Hancock, Jefferson, Logan, Marshall, Scott, Simpson and Woodford).

chemicals for every Kentuckian. The major generators of TRI chemicals in the state are the chemical, primary and fabricated metals, and paper/allied products industry **(Figure 2)**.

It should be noted that the TRI inventory has serious limitations when it comes to detailing toxic releases and measuring reduction trends. Chemicals are continually added to or deleted from the TRI list, making yearly comparisons difficult, and the TRI does not include many chemicals. While the number of chemicals required to be reported was recently increased from 343 to 629 for the 1995 reporting year, the U.S. Environmental Protection Agency (U.S.EPA) estimates that the TRI only accounts for 5% of the total releases of toxic chemicals to the environment.[5] Many generators of toxic chemicals such as incinerators, utilities, mineral extraction processes, and waste management facilities are not required to report. And the annual threshold for those companies reporting is 25,000 pounds if the chemical is processed or manufactured and 10,000 if the chemical is otherwise used. Also, facilities with less than 10 employees are not required to report to TRI.

The U.S. EPA's recent efforts to expand TRI toxics reporting to 6,400 new facilities including petroleum bulk terminals, coal mines, and chemical wholesalers have come under fire by industry groups claiming these facilities are already heavily regulated.[6] Despite these limitations, the TRI is still an important source of data on the generation and release of industrial toxic chemicals.

Toxic Releases to KY's Environment Decline 57% Since 1988

Most industrial toxic chemicals in the state are managed on the site of generation, primarily through recycling and treatment **(Figure 1)**. However, in 1994, 36.2 million pounds of industrial toxic chemicals were reported released to Kentucky's environment. That year, nationwide releases totaled 2.26 billion pounds. Kentucky ranked 21st in the nation for total 1994 TRI toxic chemical releases.[7]

Some areas of the state have a larger concentration of industry and thus a greater burden and potential environmental or health risks from toxics **(Figure 3 & Table on page 15)**. Eight counties accounted for 68% of the toxic chemical releases in 1994 (Ballard, Hancock, Jefferson, Logan, Marshall, Scott, Simpson, and Woodford). The top ten chemicals released to the air, water, and land are listed in **Figure 4**.

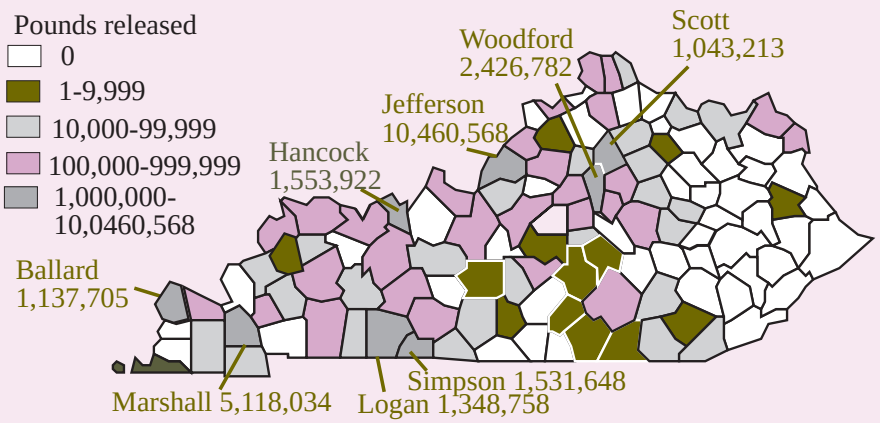
Documenting industrial toxic chemical release trends is difficult because reporting requirements have changed nearly every year. But based on the data reported by industrial sources, the total releases of TRI toxic chemicals to Kentucky's environment have declined 57% between 1988 and 1994 **(Figure 1)**.

Toxics Releases Decline to Air 25%, to Water 71% Since 1988

Most of toxic releases reported in Kentucky are to the air. In 1994, air releases accounted for 97% of the toxic emissions. Reported toxic air releases have declined 25% between 1988 and 1994 **(Figure 5)**. A more detailed discussion of air toxic emissions appears in the 1996 State of Kentucky's Environment Report on Air Quality which can be obtained from EQC.

An estimated 3.2 million pounds of TRI chemicals were also reported released to state waterways from 1988 through 1994. But trends reveal that the yearly amount of toxics discharged to waterways is declining. In 1994, 403,292 pounds of toxic

Figure 3 Toxic Chemical Releases in KY and Leading Counties (1994)



Source: Toxic Release Inventory Report

chemicals were reported released to waterways, an 18% decrease from 1993 and a 71% reduction since 1988 **(Figure 5)**. Of the 13 river basins in Kentucky, the Tennessee River received the greatest burden of toxic chemical discharges from Kentucky industries since 1990, followed by the Big Sandy and Ohio rivers **(Figure 6)**.[8]

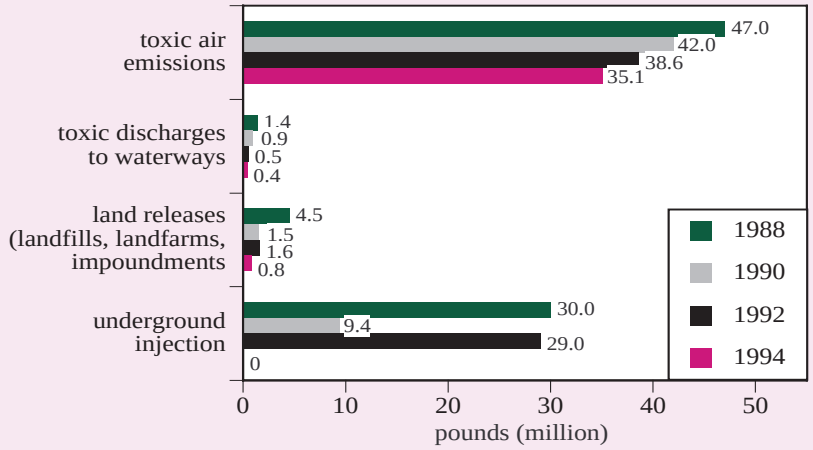
During 1994, there was no underground injection of toxic chemicals reported in Kentucky **(Figure 5). The** only facility in the state with permitted injection wells, E.I. DuPont in Jefferson County, found a market for the hydrochloric acid it had been injecting and closed its two injection wells in 1992.

Releases to the land, which include impoundments and landfills, show declining trends **(Figure 5)**. Land releases have fallen 82% since 1988. The decline is primarily attributed to one facility, Newport Steel, reducing its land releases from 3.4 million pounds in 1988 to zero releases in 1994. The company is no longer disposing of its hazardous waste in its on-site landfill in Campbell County and is now recycling much of this waste.

Most Chemicals Transferred Off-Site are Recycled

Toxic chemicals generated in Kentucky and transferred off-site for disposal or treatment have varied from year to year **(Figure 1)**. In the past few years, the amount of toxics transferred off-site by Kentucky facilities for waste management has shown declining trends, from 88 million pounds in 1993 to 73 million in 1994.

Figure 5 Toxic Releases to Kentucky's Environment



Note: Releases on-site of generation. Source: Toxic Release Inventory Reports

Figure 4 Top Ten Toxic Chemicals Released to KY's Air, Water, Land (1994)

Air Releases (lbs.)

Toluene (6,200,555)
Methanol (5,045,316)
Xylene (4,231,861)
Chlorodifluoromethane (2,329,742)
Dichloromethane (1,177,328)
Glycol Ethers (1,075,992)
Methyl Ethyl Ketone (1,019,709)
Trichloroethylene (1,009,103)
Hydrochloric Acid (874,150)
1,1-Dichloro-1-fluoroethane (766,752)

Water Releases (lbs.)

Ammonia (159,119)
Methanol (74,600)
Chlorine (37,103)
Zinc Compounds (20,849)
Formaldehyde (14,748)
Methyl Ethyl Ketone (13,365)
Hydrogen Fluoride (13,150)
Tert-butyl Alcohol (10,824)
Hydrochloric Acid (9,535)
Manganese Compounds (5,943)

Land Releases (lbs.)

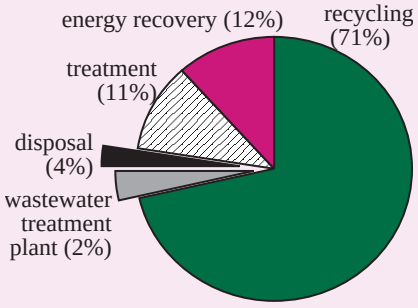
Aluminum (570,005)
Copper (72,575)
Manganese (56,255)
Copper Compounds (18,265)
Manganese Compounds (16,014)
Chromium Compounds (15,838)
Zinc Compounds (13,005)
Chromium (11,284)
Nickel (10,758)
Ethylene Glycol (8,862)

Figure 6 Reported Toxic Chemical Discharges to KY Waterways

River Basin	lbs. Released (1990-94)
TN River	1,459,177
Big Sandy	346,373
Ohio	316,538
MS River	299,450
Ohio Tribs.*	92,250
Barren	79,548

**White Oak watershed.*
Source: Environmental Working Group

Figure 7 Toxic Transfers Off-Site for Treatment/Disposal (1994)



Note: Based on 73 million pounds of toxics transferred off-site by KY companies.
Source: Toxic Release Inventory Report

Most of the chemicals transferred off-site were recycled or burned in industrial boilers for energy **(Figure 7)**. Copper, lead compounds, and manganese comprised 47% of the toxic chemicals recycled. Organic solvents are also commonly recycled.

About 12% of the toxics transferred off-site were treated to render them nonhazardous. Kentucky facilities sent 7.3 million pounds off-site for treatment in 1994, compared to 9.57 million pounds in 1993 and 15.9 million pounds in 1988. Treatment can take several forms, including physical neutralization and incineration.

Kentucky industries also reported discharging 1.8 million pounds of toxic chemicals to publicly owned wastewater treatment plants during 1994, compared to 2.1 million pounds in 1993 and 2.8 million pounds in 1988. Although the U.S. EPA does not consider industrial toxic chemical discharges to publicly owned wastewater treatment plants as direct releases, they estimate that about 10% of these transfers pass untreated through wastewater systems and are discharged to waterways.[9]

Most of the 73 million pounds of toxic chemicals transferred off-site in 1994 by Kentucky industries were recycled or used for energy recovery.

Kentucky Net Exporter of Toxic Chemical Waste

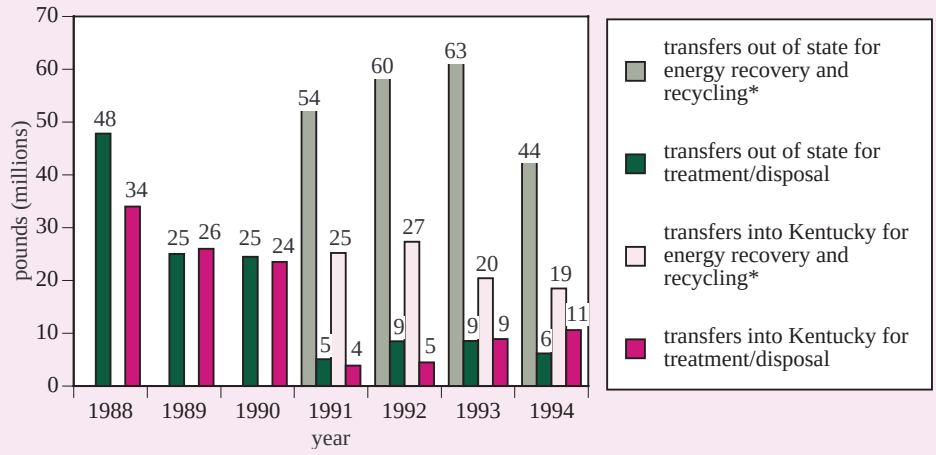
Kentucky is a net exporter of toxic chemical waste **(Figure 8)**. In 1994, 50 million pounds of chemicals were shipped to other states. About 88% of the waste transferred out of state was recycled or used as fuel for energy. Kentucky received 30 million pounds of toxic chemicals from other states for treatment and disposal. About 63% of this waste was recycled or used as an energy source. Unfortunately, the TRI database in not programmed to easily summarize data to determine what companies in Kentucky are major shippers of toxics out of state or are receivers of toxic chemicals imported into the state for treatment or disposal .

Kentucky is a net exporter of toxic chemical waste. In 1994, 50 million pounds of chemicals were shipped to other states. About 88% of the waste transferred out of Kentucky was recycled or used as fuel for energy.

Ten Facilities Release 54% of Toxic Emissions in 1994

Ten facilities accounted for 54% of the total on-site releases of toxic chemicals in 1994. Five of these facilities have reduced toxic emissions since 1988 **(Figure 9)**. For example, Air Products in Marshall County cut releases by 55% and American Synthetic Rubber reduced emissions by 42%. A listing of the top ten industries releasing toxic chemicals to the air, water, and land in Kentucky during 1994 appears in **Figure 10**.

Figure 8 Toxic Chemical Exports/Imports in Kentucky

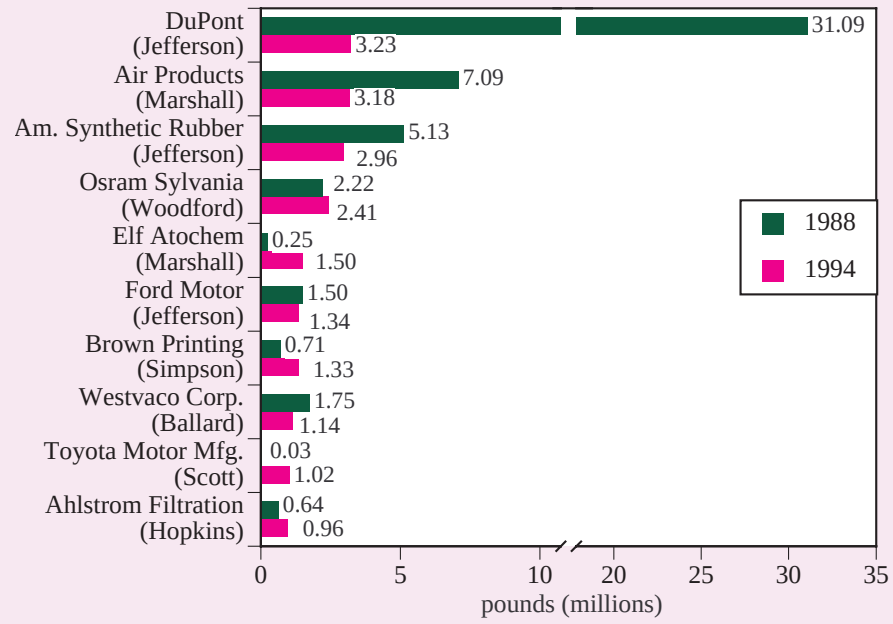


**Facilities not required to report or delineate chemicals transferred for recycling and energy recovery prior to 1991. Source: Toxic Release Inventory Reports*

Priority Toxic Releases and Transfers Fall 39%

In Kentucky, industries have reduced the total releases and transfers of 17 high-priority chemicals by 39%, from 31.8 million pounds in 1988 to 19.4 million pounds in 1994 **(Figure 11)**. Priority toxics are TRI chemicals that have been targeted for reduction by the U.S. EPA because they are highly toxic, used in large volumes, or pose a significant risk to public health and the environment. The U.S. EPA estab-

Figure 9 Top 10 Facilities Releasing Toxic Chemicals in KY



Note: Reported releases on-site. Source: Toxic Release Inventory Reports

Figure 10 Top Ten Releasers of Toxic Chemicals in KY (1994)

To Air-Company, County (lbs.)
DuPont, Jefferson (3,233,381)
Air Products, Marshall (3,172,655)
Am. Synthetic, Jefferson (2,963,602)
Osram Sylv., Jefferson (2,413,755)
Elf Atochem, Marshall (1,475,615)
Ford Motor, Jefferson (1,343,275)
Brown Print, Simpson (1,334,275)
Westvaco, Ballard (1,062,155)
Toyota, Scott (1,022,055)
Ahlstrom Filt., Hopkins (959,860)
54% of state total air releases

To Water-Company, County (lbs.)
ISP Chemicals, Marshall (141,077)
Westvaco, Ballard (71,500)
Ashland Petroleum, Boyd (69,692)
Elf Atochem, Marshall (24,485).
TVA, McCracken (21,000)
Willamette, Hancock (17,100)
U.S. Bureau Prison, Fayette (13,000)
Air Products, Marshall (10,755)
AK Steel, Boyd (7,395)
Elf Atochem, Carroll (3,966)
98% of state total water releases

To Land-Company, County (lbs.)
Imco Recycling, Butler (670,790)
Dravo Lime, Mason (23,482)
Alcan Ingot, Henderson (21,120)
Dow Corning, Carroll (18,348)
ISP Chemicals, Marshall (15,586)
AK Steel, Boyd (15,015)
Rohm and Haas, Jefferson (13,000)
KY Leather Co., Bell (6,174)
Westvaco, Ballard (4,050)
Dayton Walther, Carroll (3,205)
98% of state total land releases

lished a voluntary pollution prevention program, entitled 33/50, in 1991 to promote the voluntary reduction of these 17 priority chemicals 33% by 1992 and 50% by 1995, using 1988 as the base year. Nationwide, 1,300 companies are participating in the 33/50 program. Seventy-six of those companies have facilities in Kentucky.[10]

The total on-site releases and transfers off-site for further waste management of the 17 priority toxics generated in the state have declined, with the exception of two chemicals. Benzene increased 56% between 1988 and 1994 due to rise in demand **(Figure 12)**. Benzene, which is an important component of unleaded gasoline because of its antiknock characteristics, is a human carcinogen that can also effect the nervous system and is toxic to the environment. Trichloroethylene also increased 33%. This chemical is a potential human carcinogen that can also effect the nervous system and cause developmental problems. While **Figure 12** also shows that releases/transfers of heavy metals, such as mercury and lead have declined, heavy metals warrant particular concern because they can reside in the environment for hundreds of years.

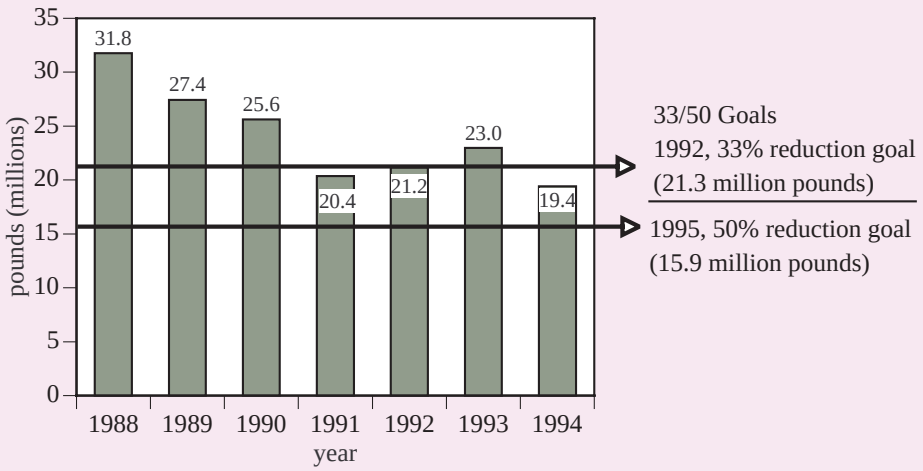
More Incentives Needed to Prevent Toxics Generation

The best way to minimize the threats posed by toxic chemicals is to eliminate waste at every step of industrial process. There are many notable examples in Kentucky where companies have worked to prevent the generation of toxics. For example, MPD, a midsize manufacturer of electronic equipment in Owensboro, reduced the generation of trichloroethylene from 13,200 pounds in 1994 to 5,940 pounds in 1995, while saving $7,000 in disposal costs. Dow Corning in Carrollton reduced all toxic emissions by 92% between 1988 and 1995 and releases of 17 priority toxics by 100%, while more than doubling production. The U.S. EPA reports that the 1,300 companies participating in the 33/50 program at the national level had met the 1995 goal to reduce 17 priority toxics by 50% for reporting year 1994. A review of those 76 companies with operations in Kentucky participating in the 33/50 program reveals that 31 facilities have met the 1995 50% reduction goal for the 17 priority chemicals **(Figure 13)**.

The best way to minimize the threats posed by toxic chemicals is to eliminate waste at every step of industrial process.

In Kentucky, industries have reduced the total releases and transfers of 17 high priority chemicals by 39%, from 31.8 million pounds in 1988 to 19.4 million pounds in 1994. Priority toxics are TRI chemicals that have been targeted for reduction by the U.S. EPA because they are highly toxic, used in large volumes, or pose a significant risk to public health and the environment.

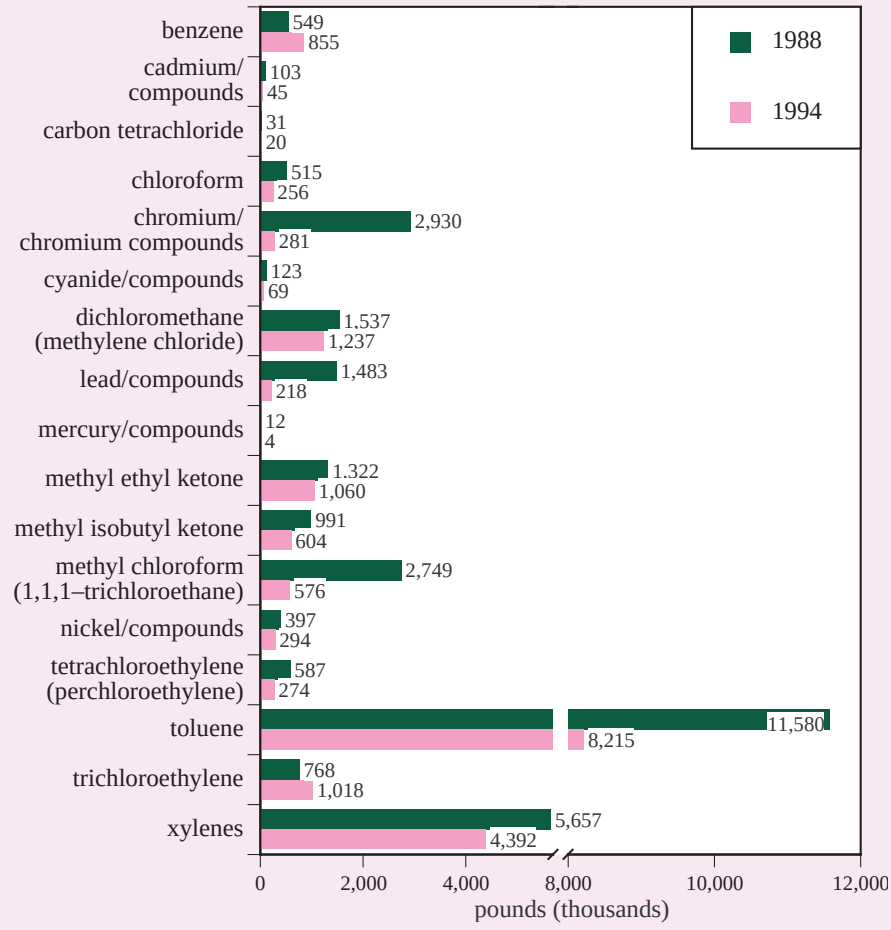
Figure 11 Top 10 Facilities Releasing Toxic Chemicals in KY



Note: Based on releases on-site and transfers off-site for waste management. Does not include transfers for recycling and energy recovery which were not reported until 1991. The yearly totals are based on the reduction of priority chemicals by all KY facilities and not just those participating in the national 33/50 program. Source: Toxic Release Inventory Reports

While the releases and transfers of 17 priority toxics generated in Kentucky have declined, two of these chemicals are increasing. Benzene increased 56% since 1988. Benzene is a human carcinogen that can also effect the nervous systems and is toxic to the environment. Trichloroethylene also increased 33% since 1988. This chemical is a potential human carcinogen that can also cause developmental problems.

Figure 12 Releases and Transfers of 17 Priority Toxics in KY



Note: 33/50 or priority toxics are 17 chemicals prioritized for reduction by the U.S. EPA due to their high toxicity, carcinogenicity, or high volume of release with potential environmental impacts. This chart includes releases on-site and transfers off-site. Excludes transfers for recycling and energy recovery which were not required to be reported until 1991.
Source: Toxic Release Inventory Reports

Many companies are getting assistance from the Kentucky Pollution Prevention Center, which was created under state law in 1994, to help businesses voluntarily reduce wastes. The goals of this initiative are to reduce the generation of TRI toxic chemicals and hazardous waste 25% by 1997 and 50% by the year 2002, using 1987 as a baseline. Since 1990, the center, located at the University of Louisville, has performed 266 on-site inspections. During 1995, the center also conducted 80 workshops which were attended by 5,000 people.

Much more remains to be done to meet the state's goal to reduce the generation of toxic chemicals. At a recent pollution prevention forum hosted by EQC, several participants expressed the need to implement the state Environmental Leadership Program passed in 1994 (KRS 224.46-335). The law includes incentives for pollution prevention including green product labeling, compliance credits, consolidation of requirements into one permit, offsetting voluntary actions against future regulatory requirements, and accelerated review of permits. The state has yet to promulgate regulations to implement the program.

Other recommendations suggested at the EQC forum include

- Utilize alternative enforcement actions aimed at reducing toxics.
- Establish community-based goals for pollution prevention.
- Create a pollution prevention policy to guide the state's permitting, compliance, and enforcement programs.
- Provide state regulatory and/or economic incentives for pollution prevention.
- Conduct a pollution prevention campaign to educate corporate leaders in KY.
- Mandate a fee for those companies generating certain toxic chemicals.

Figure 13 KY 33/50 Companies Meeting 50% National Priority Toxic Reduction Goal

Company (county)	% reduction
Airtech Chemical (Boone)	100%
ATR Wire (Boyle)	100%
Dow Corning (Carroll)	100%
General Tire (Graves)	100%
Interlake (Bullitt)	100%
National Southwire (Hancock)	100%
United Tech. (Union)	100%
Dept. Energy (McCracken)	100%
Florida Tile (Anderson)	100%
Inland Container (Jefferson)	100%
SKW Alloys (Marshall)	100%
Am. Standard (Jefferson)	100%
Tecumseh (Pulaski)	99%
Speed Queen (Hopkins)	94%
Gates Rubber (Hardin)	90%
North Star Steel (Marshall)	87%
Am. Olean Tile (Hancock)	86%
Phillips Lighting (Boyle, Madison)	86%
Emerson Elec. (Logan)	83%
Lord Corp. (Warren)	80%
Armco Steel (Boyd)	73%
Vista Performance (Jefferson)	71%
Elf Atochem (Carroll, Marshall)	70%
General Motors (Warren)	70%
Englehard Corp. (Jefferson)	61%
Green River Steel (Daviess)	61%
B.F. Goodrich (Marshall, Jefferson, Knox)	59%
Gamco Products (Henderson)	59%
Westvaco Corp. (Ballard)	56%
Air Products (Marshall)	54%
Thomas Ind. (Christian, Ohio)	51%

Note: Based on 1988-1994 reductions of 17 priority toxic chemicals released on-site or transferred off-site. Source: Toxic Release Inventory Reports

Toxics Impacts on Health and Ecosystems Are Hard to Assess

Assessing the impacts of toxic chemicals is difficult since little is known about the toxicity of most chemicals or their cumulative effects on health and the environment. Of the 70,000 chemicals in the marketplace, only a small fraction have been adequately assessed for toxic effects on humans and other life forms. EQC has compiled a chart on the known risks posed by the top 15 TRI chemicals released to Kentucky's environment. **Figure 14** shows that exposure to 10 of these chemicals at certain levels can effect the nervous system and two are potential carcinogens. It is important to note that several factors will determine whether harmful health effects will occur upon exposure to a toxic chemical. These include dose, duration, exposure to other chemicals, age, sex, lifestyle, and state of health.

In addition, five of the top 15 TRI chemicals released in Kentucky are reproductive toxins and nine have been linked to fetus developmental defects. The U.S. EPA recently announced it plans to "flag" chemicals on the TRI list that have reproductive or fetus developmental effects to better incorporate gender considerations into risk assessment and standard-setting.[11] A state Birth Surveillance Registry, located in the Cabinet for Health Services, will begin collecting information on the incidence of birth defects, still births, disabling conditions and their possible causes. The registry should serve as an important tool to help identify possible linkages between birth defects and environmental conditions.

Exposure to 10 of the top 15 chemicals released to Kentucky's environment at certain levels can effect the nervous system, five are reproductive toxins, two are potential carcinogens, and nine have been linked to fetus developmental defects. A number of factors such as dose and duration will determine if harmful effects will occur upon exposure to a chemical.

Toxic Hot Spots in State Studied

The TRI is a useful tool to identify those areas of the state where further investigation should be conducted into possible environmental and health effects posed by toxic chemicals. One such study has been initiated in the KY-WV-OH 2,300 mile tri-state area that contains 42 industries near Catlettsburg, KY, and Kenova, WV. The Tri-State Geographic Initiative is a multimedia environmental study being

Figure 14 Potential Health and Environmental Effects of Top 15 Chemicals Released to Kentucky's Environment

	Pounds (1994)	acute	cancer	chronic	developmental	reproductive	neurotoxic	ecotoxic	smog	ozone depleter
Toluene	6,201,726	x		x	x	x	x	x	x	
Methanol	4,233,314	x		x	x	x	x	x		
Xylene (mixed isomers)	4,233,314	x					x			
Chlorodifluoromethane	2,329,742	x			x	x	x			x
Dichloromethane	1,177,648	x	x	x			x	x		
Glycol Ethers	1,076,296	x		x		x				
Methyl Ethyl Ketone	1,033,074	x			x		x			
Trichloroethylene	1,009,102	x	x	x	x		x			
Hydrochloric Acid	896,102	x						x		
Aluminum (fume/dust)	864,698	x		x	x		x	x		
1,1-Dichloro-1-fluoroethane	864,688	x					x			x
1-Chloro-1,1-difluoroethane	766,772	x			x					x
Hydrogen Fluoride	743,970	x			x					
Ammonia	717,515	x						x		
N-Butyl Alcohol	689,311	x			x	x	x	x		

Note: Acute toxicity-toxicity that results from a single exposure. Cancer-potential human carcinogenic effects based on current classification by U.S. EPA. Chronic toxicity-toxicity that results from repeated exposure over a long period. Developmental-causing fetal developmental defects. Reproductive-causing reduced fertility or infertility, miscarriages. Neurotoxic-effects to the nervous system. Ecotoxic-chemicals that are toxic to aquatic and terrestrial organisms, both natural and agricultural. Smog-ground-level ozone precursor. Ozone depleter-release linked to the thinning of the ozone layer. Source: KY DEP Risk Assessment Branch, Toxic Release Inventory Report, U.S. Agency for Toxic and Disease Registry, Federal Hazardous Substances Database

The TRI is a useful tool to identify those areas of the state where further investigation should be conducted into possible environmental and health effects posed by toxic chemicals.

In April 1996, six air toxics monitors became fully operational in Catlettsburg, KY, and Kenova, WV, area. The monitors will measure air toxics concentrations to determine if levels pose a threat to public health and the environment.

conducted by state, local, and federal environmental agencies. The area has been divided into six industrial clusters. In April 1996, six air toxics monitors became fully operational in the Catlettsburg, KY, and Kenova, WV, cluster area which includes four major industries. The monitors will measure air toxics concentrations to determine if levels pose a threat to public health and the environment. Monitoring is expected to continue for one year then be moved to other industrial cluster areas.

The Calvert City Multimedia Project was initiated by the state in 1987 to assess the impacts of industrial pollutants on public health and environmental quality. Calvert City, in Marshall County, is home to several chemical and industrial plants. During 1994, industries in Marshall County reported releasing 5.1 million pounds of toxics to the environment, the second highest levels in the state **(see Figure 3 & table on page 15)**. Some of the findings from the project studies include elevated air levels of VOCs and carbon disulfide, and degradation of the Cypress Creek watershed. Reevaluation of the watershed in the early 1990s found the creek to be recovering after industrial discharges were moved from the creek to the Tennessee River. In addition, a greater incidence of non-Hodgkin's lymphoma and brain tumors in males were discovered in the Calvert City area, although the cause is unknown. While Kentucky has had a cancer registry since 1991, lack of funding and resources have limited its capability to assess the relationship between cancer clusters and toxic hot spots in the state. A federal health study was conducted in response to public concerns that pollution from industrial facilities and a commercial hazardous waste incinerator was causing cancer and other health concerns. The results of the federal health study, issued in 1995, found that Calvert City residents' health was similar to the health of people living 36 miles away in Cadiz. Environmental interests in Calvert City have questioned the findings of the study, indicat-

ing that industrial emissions could also be affecting the residents of Cadiz.

There are other areas in Kentucky where toxic chemicals are alleged to be impacting public health. In Owenton, KY, two lawsuits were filed by residents in 1996 claiming an auto parts manufacturing plant built near their town last year exposed them to a highly toxic chemical, nickel carbonyl, during a test run. The owners chose not to open the plant due to public opposition. An assessment conducted by the state in 1996 found no evidence that a significant amount of the toxin was released by the plant, although 10 pounds of the chemical could not be accounted for. In Dayhoit, a lawsuit was recently settled between National Electric Coil and 550 Harlan County residents who alleged exposure to vinyl chloride in well water. The company used the solvent at its plant, which operated from 1951 to 1985.

Residents living in western Louisville near an industrial corridor known as Rubbertown have expressed concern about possible health effects from exposure to toxic chemicals. The neighborhoods around Rubbertown, a World War II industrial chemical complex, are largely composed of low-income and minority people. This area of Jefferson County has an above average state cancer rate (262 per 100,000 population compared to the statewide rate of 192 per 100,000). A study recently conducted by the Jefferson County Health Department suggests that many cancers in the area are not due to emissions from chemical plants and may be related more to health care quality, accessibility, and affordability, although it was noted that pollution may be a factor in some cancer cases.

In the spring of 1996, the Jefferson County Health Department received a grant from the National Association of City-County Health Organizations to assemble the West County Community Task Force to identify public concerns in Rubbertown area. In September 1996, the task force formalized its list of concerns, including odor problems, particulate air pollution, toxic discharges to waterways, public access to toxic emissions and other data, the need for health screening and assessments, and access to affordable, quality health care. The task force made several recommendations including identification and remediation of dump and spill sites, installation of continuous monitors for major facilities emitting air toxics, development of a community pollution prevention strategy, and conduct a study to identify health and environmental risks in the Rubbertown area.

In December 1996, the University of Louisville was awarded a $312,000 Environmental Justice grant from the U.S. EPA to build upon the recommendations of the West County Community Task Force and examine ways to reduce emissions from industrial sources in the Rubbertown area. The U.S. EPA also awarded a $20,000 grant to the Justice Resource Center in Shelbyville, KY to help document and monitor environmental problems in low-income neighborhoods. The center plans to use the funds to monitor smokestack emissions in Louisville and will work to educate low-income neighborhoods about pollution and health.

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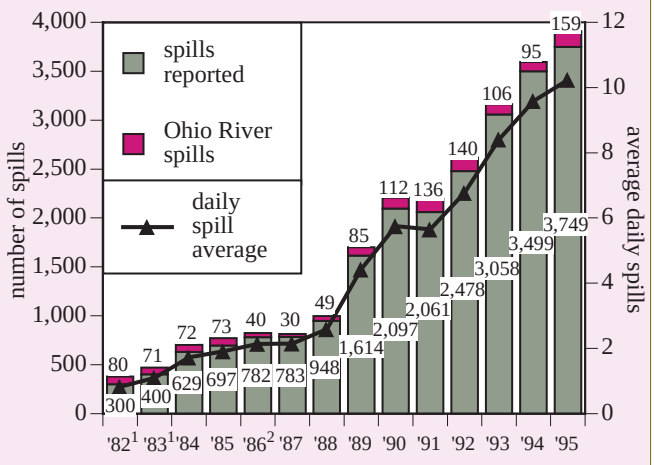
Residents living in western Louisville near an industrial corridor known as Rubbertown have expressed concern about possible health effects from exposure to toxic chemicals. In September 1996 a task force formalized a list of public concerns in the area including odor problems, particulate air pollution, toxic discharges to waterways, and access to affordable, quality health care.

Toxic and Hazardous Spills

Toxic spills are considered a high ecological threat in Kentucky.[12] Most spills reported to state and local officials are transportation related or occur at industrial sites. Reported chemical spills continue to increase in Kentucky. This is attributed to an increase in transportation activity, tightening of reporting requirements in 1993, and better education and awareness of reporting requirements. In 1994, 3,898 spills and incidents were reported, 159 of them occurred along the Ohio River **(Figure 15)**. The state now averages about 10 spills per day.

The number of spills reported to state and local officials continues to increase. In 1994, 3,898 spills were reported, 159 of them occurred along the Ohio River. The state now averages about 10 spills per day.

Figure 15 Toxic and Hazardous Spills in KY



[1]Estimates. [2]Federal Emergency Planning and Community Right-to-Know Act signed into law which required more extensive spill reporting. Source: KY Dept. for Environmental Protection; Ohio River Valley Sanitation Commission

There have been several major spills/incidents in the state in the past few years including

■ August 12, 1995 - A nitric acid cloud released at the Square D Company in Lexington forced the evacuation of several businesses and a nearby golf course within a half-mile radius of the plant.

■ August 21, 1995 - A sulfuric acid leak from a DuPont plant in Greenup County caused 1,000 residents to be evacuated from their homes and hospitalized 21 people.

■ January 8, 1996 - A 5,000-gallon storage tank at Ashland Inc.'s Catlettsburg refinery ruptured, spilling about 200 gallons of fuel into the Big Sandy River.

■ March 2, 1996 - A railroad car explosion spewed ammonium bisulfate one block wide and several blocks long, covering houses, cars, lawns, and trees in the Clifton neighborhood in Louisville.

■ May 22, 1996 - A sulfuric acid leak from a tractor-trailer near Cynthiana off U.S. Highway 27 was neutralized with lime. Several firefighters were treated for blistered legs from exposure to the acid.

■ June 8, 1996 - A chemical spill from a tanker truck kept KY 40 closed most of the day and caused the evacuation of 20 residents near Warfield.

■ June 19, 1996 - Officials in Northern KY discovered a mile-long oil slick on the Licking River of unknown origin and closed the river to traffic for several hours.

Agriculture, Lawn-Care Chemicals

There are about 21,000 pesticide products and 860 active ingredients registered for use in the U.S.[13]

There are about 21,000 pesticide products and 860 active ingredients registered for use in the U.S.[13] An active ingredient is defined as a chemical that can kill, repel, attract, mitigate, or control a pest or that acts as a plant growth regulator. The U.S. EPA pesticide registration process is intended to address the toxicity of individual active pesticide ingredients to health and the environment. But toxicity testing for many pesticides is incomplete. Moreover, by focusing on individual chemicals, the registration process fails to account for multiple, additive, or synergistic exposures.[14] Most pesticide formulations also contain inert ingredients with their own toxicity and health risks which are relatively unknown. It should be noted that the term "pesticides," as defined under federal law and used in this report, is a broad nonspecific term which includes insecticides, herbicides, fungicides, and other agents.

Agriculture accounts for three-fourths of the total amount of pesticides used in the U.S.[14] In Kentucky, sales of agricultural pesticides increased slightly in recent years. However, five-year trends reveal that sales overall have declined by 6% between 1990 and 1995.

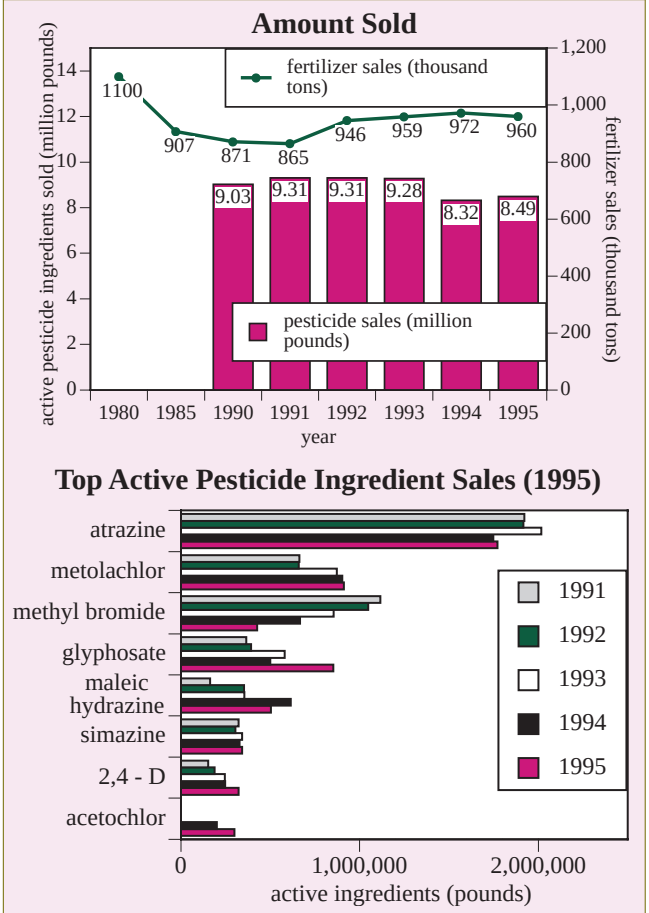
Pesticides are used in large quantities throughout the world. Nationwide, pesticide use increased steadily through the 1960s and 70s; however, this trend has slowed during the 1980s and 90s due to the development of more potent pesticides, more efficient usage, and lower farm commodity prices.[15] But, according to U.S. EPA data, nationwide pesticide use may have hit an all-time high in 1995 at 1.25 billion pounds compared to 1.23 billion pounds in 1994, reversing its downward trend.[16]

Farm Chemical Use in KY Declines 6% Since 1990

Pesticides are a key factor in the production of food and fiber in the U.S. Agriculture accounts for three-fourths of the total amount of pesticides used in the U.S.[17] In Kentucky, sales of agricultural pesticides increased slightly in recent years, totaling 8.49 million pounds in 1995. However, five-year trends reveal that overall pesticide sales have declined by 6% between 1990 and 1995 **(Figure 16)**.

The decline in sales is likely the result of several factors, including a decrease in corn production in the state. The 1995 corn crop was the lowest in four years in Kentucky.[18] The reduction may also be partly due to a shift from the use of tobacco beds to greenhouses and float systems. In 1995, about one-half of Kentucky's tobacco plants were produced with greenhouse/float systems, reducing the need for some pesticides.[19] And harvested acres of tobacco have dropped 20,000 acres per year in 1994 and 1995. Farmer education programs that encourage reduced use of pesticides, like the Integrated Pest Management Program, may also be contributing to the decline in sales. Finally, some pesticide formulations have been changed to make them more concentrated resulting in a smaller amount being applied to achieve the same results of previous formulations. It should be noted that sales data are compiled from annual surveys of agricultural pesticide suppliers in Kentucky and may not be complete. However, the data is important since it is the only information available to document the type and amount of agricultural pesticides used in the state.

Figure 16 Agricultural Chemical Sales in KY



Note: Pesticide sales based on annual surveys. Source: KY Department of Agriculture, KY Agriculture Statistics Service

U.S. EPA Plans to Restrict Use of Several Common Pesticides Used in KY

Eight agricultural pesticides accounted for 64% of the sales in Kentucky in 1995 **(Figure 15)**. As has been the case for the past six years, atrazine remains the top agricultural pesticide sold. Atrazine is a herbicide used to control weeds in field corn. The second leading pesticide sold in the state is metolachlor, another broad spectrum herbicide. Data also reveal that the sale of methyl bromide in 1996, the third leading pesticide sold in the state, has decreased 62% since 1991. Methyl bromide is a soil fumigant used primarily in tobacco beds. However, about half of the tobacco plants grown in Kentucky are now produced in greenhouses reducing the need for this chemical. Methyl bromide is considered an ozone-depleting chemical and will be phased out of use by the year 2001. Another widely used herbicide, cyanazine (ranked 16th in state sales), will be phased out over the next four years because of suspected cancer risks. In 1995, 132,391 pounds of cyanazine were sold compared to 149,112 pounds in 1991.

Data reveal that the sale of methyl bromide, the third leading pesticide sold in the state, has decreased 62% since 1991. Methyl bromide is considered an ozone-depleting chemical and will be phased out of use by the year 2001.

Some pesticides are increasing in sales, including glyphosate (Roundup™) an all-purpose herbicide used in corn and soybean production. Roundup™ is widely used by farmers who practice conservation tillage, a group of plowing techniques that disturb less soil and reduce erosion, to kill weeds prior to planting. The sale of acetochlor, a recently approved pesticide, has also increased in Kentucky.

Several pesticides used in Kentucky will be affected by a rule proposed by the U.S. EPA in June 1996. The rule will restrict the use of five pesticides that have been identified as either probable or possible human carcinogens — alachlor, atrazine, cyanazine, metolachlor, and simazine.[20] These pesticides have been detected in groundwater at short durations in Kentucky during the growing season.[21] Atrazine has also been detected at elevated levels at drinking water intakes in Kentucky along the Ohio River. The proposed federal rule will require the develop-

ment of state comprehensive groundwater protection programs including pesticide state management plans to prevent groundwater contamination.

Programs Collect Old Pesticides, Recycle Containers

A state program to collect unused agricultural pesticides began in 1996. The KY Department of Agriculture expects to collect 50,000 pounds of unused pesticides during 1996.

A state program to collect unused agricultural pesticides began in 1996. The KY Department of Agriculture expects to collect 50,000 pounds of unused pesticides during 1996. The program is funded through pesticide registration fees. In addition, 1996 marked the sixth year of a rinse-and-return plastic pesticide container recycling project. The 1996 program, sponsored by the KY Fertilizer and Agriculture Chemical Association, along with various cosponsors, was funded by a $6,900 donation from DuPont. During 1996, 72 counties participated in the program, and 93,468 pounds of plastic were collected, a 16% increase since 1995. About 27% of the plastic pesticide jugs sold in the state were recycled. A new state law to regulate the storage of fertilizer and pesticides was also passed in 1996 to reduce the potential for surface and ground water contamination.

Random Testing Finds Pesticide Residues in 4% of KY Produce

Random state testing of agricultural produce grown in Kentucky found that 4% of the samples had trace pesticide residues. Levels detected were below the tolerance standards set by the federal government.

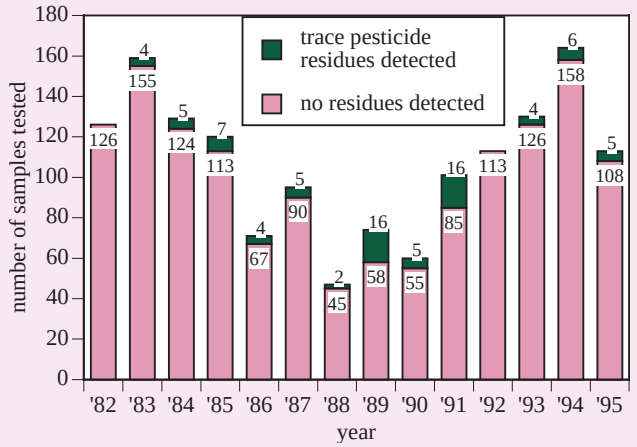
The safety of food has long been a public concern. There is a common perception that food supplies may not be as wholesome as desired because of pesticide and other chemical residues.[22] But according to former U.S. Surgeon General Dr. C. Everett Koop, "Our food supply is not only the safest, but is the most abundant in the world and pesticides are one of the important tools that have made that abundance possible."[23] Still, many Americans remain worried about chemical residues in food, especially as they affect infants and children. A 1994 U.S. Government Accounting Office public opinion poll found that chemical residues in food were rated as the preeminent health hazard by 72% of those surveyed.[24]

Public concerns have led to an increase in demand for chemical-free produce in Kentucky. In 1996, 102 farms were registered as organic farms, compared to 27 in 1990. The KY Department of Agriculture expects the number of organic farms to increase with additional interest in organic field crops and produce. The state is also looking at developing an animal product organic-certification program.

Random state testing in 1995 of produce grown in Kentucky found that 4% of the 113 samples had trace pesticide residues **(Figure 17)**. Levels detected were below the tolerance standards which represent the maximum residue allowed on food. But most of the food we consume comes from other states and countries. The federal Food and Drug Administration (FDA) routinely tests food for pesticide residues. The agency has reported that pesticide residues on infant and adult foods are almost always well below tolerances set by the federal government.[25] In 1994, of the 11,346 domestic and imported food samples tested by the FDA, 195 samples or 1.7% had pesticide residues above the tolerance standards. However, the FDA testing program has been criticized because less than 1% of the nation's food is monitored and the penalties for unacceptable residue levels do little to stop contaminated foods from entering the market.[26]

Congress recently passed legislation to further address pesticide food safety concerns. The federal Food Quality Protection Act was signed into law in August 1996. The act amends the Federal Insecticide,

Figure 17 Pesticide Residues in KY Produce



Note: Food samples screened for parts per billion of chlorinated pesticides and .05 parts per billion of organophosphates. If other contaminants are suspected, additional analysis is conducted. Residue levels detected have been below tolerance standards since 1990. Source: KY Cabinet for Health Services

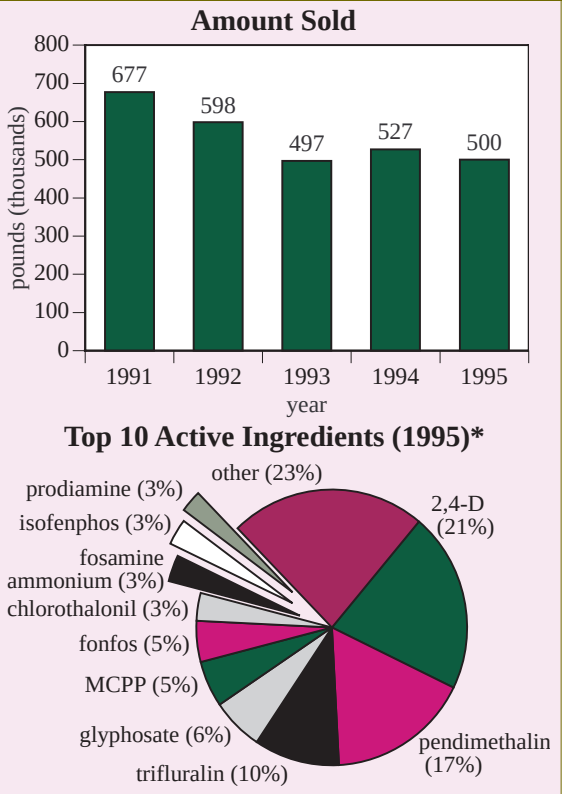
Fungicide, and Rodenticide Act (FIFRA) and the federal Food, Drug, and Cosmetic Act. The act mandates a single, health-based standard for pesticides in food, provides special protections for infants and children, expedites approval of safer pesticides, creates incentives for farmers for effective crop protection tools, and requires reevaluation of pesticide registrations and tolerances to ensure they are up to date.[27] The law also requires grocery stores to provide information on the health effects of pesticides and how to avoid risks.

Commercial Lawn-Care Pesticide Sales Show Decline of 6% Since 1991

The sale of lawn-care pesticides in Kentucky to commercial applicators averages about 560,000 pounds per year, However, the five-year trend shows a decline in sales by about 6% **(Figure 18)**. It should be noted that sales data are based on annual surveys and information is likely incomplete. In addition, this data does not include home owner pesticide sales.

Water contamination from various lawn-care chemicals has been detected in some parts of the state due to improper pesticide application and disposal. Wastewater treatment plants in Harrodsburg, Lexington, and Lawrenceburg have had problems meeting toxicity limits due to the presence of diazinon, a common insecticide sold in Kentucky, in the plants' effluent.[28] The U.S. EPA recently designated diazinon as a restricted-use product, which limits its use to licensed pesticide applicators to minimize environmental impacts. In 1995, 5,224 pounds of diazinon were sold for commercial lawn-care use in Kentucky compared to 7,615 pounds in 1991.

Figure 18 Commercial Lawn-Care Chemicals Sold in Kentucky



**Based on 500,118 pounds of active ingredients sold in KY to licenced commercial applicators om 1995 as reported in surveys. Source: KY Dept. of Agriculture*

The sale of lawn-care pesticides in Kentucky to commercial applicators averages about 500,000 pounds per year. However, the five-year trend shows a decline in sales by about 6%.

Toxics in the Home

Toxics in the home, such as lead and household hazardous products, are considered a high public health risk in Kentucky.[29] Poisoning from toxics in the home remains a significant concern. In 1995, the Kentucky Regional Poison Center received 49,764 calls, 65% of which involved small children. That year, 9% of the calls received at the poison center (4,880) involved exposure to toxic household cleansers, of which 422 were considered very serious, with one fatality. Exposure to gasoline and other hydrocarbons resulted in 1,841 calls, of which 123 were serious, with one fatality. And 1,541 calls were due to exposure to pesticides, of which 54 were serious.

New toxic threats in our homes are continually discovered. The U.S. Consumer Product Safety Commission issued an alert in June 1996 warning consumers about lead exposure from imported vinyl mini-blinds.[30] Lead was added to the mini-blinds to stabilize the plastic, but exposure to sunlight and heat causes deterioration of the blind and the release of lead dust. The agency has recommended that these blinds be removed from homes with children under six years old.

Several Kentucky counties have initiated programs to collect household toxic wastes. During 1995, Calloway, Carroll, Hardin, Jefferson, Powell, and Scott counties hosted household hazardous waste collection days. However, many counties

Poisoning from toxic chemicals in the home remains a significant concern. In 1995, the Kentucky Regional Poison Center received 49,764 calls, 65% of which involved small children.

are limited in their ability to host household collection programs due to a lack of resources and liability concerns.

In 1995, local health departments conducted 41,325 blood lead screenings in children under six years of age. Tests reveal that 226 children, nearly 1% of those tested, had lead levels in the blood high enough to cause severe and adverse health impacts such as kidney and liver damage. Another 5,382 tests (13%) found blood lead levels in children from 10 to 19 µg/dl, which can cause decreased intelligence, reduced growth, and learning disabilities.

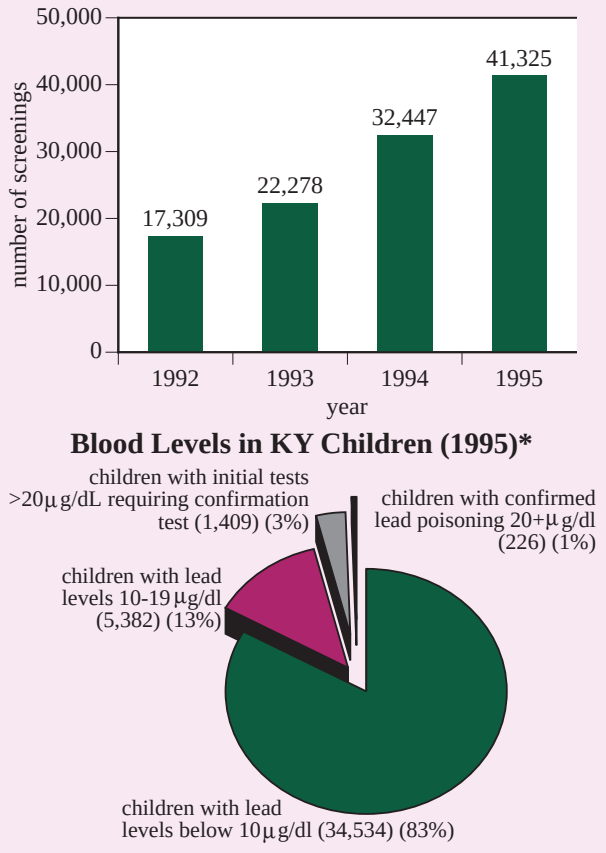
14% of 41,325 Tests Reveal Unsafe Levels of Lead in Children

While exposure to lead in the ambient air is no longer a concern since the phase out of lead-based gasoline in the 1970s and 80s, it is still a problem in some homes. Studies estimate that from 1.7 million to 3 million preschool-age children in the U.S. have unsafe levels of lead in their systems.[31]

Most lead exposure in the home is now linked to lead-based paint, which was banned for domestic use in 1978. But many homes still contain lead paint. The U.S. Department of Housing and Urban Development estimates that 64 million dwellings, 75% of houses built prior to 1978, have lead-based paint. This translates to 875,000 homes in Kentucky that could contain lead-based paint, 148,750 of which are estimated to have young children considered at risk from lead exposure. The U.S Public Health Service has called lead "the most serious environmental hazard to young children" and recommends that children under six be tested for lead.[32]

The KY Cabinet for Health Services conducts programs for lead poisoning prevention, child blood-lead level testing, and public education about the hazards of lead through local health departments. In 1995, health departments conducted 41,325 blood lead screenings on children under the age of six **(Figure 19)**. Initial tests revealed that 1,409 children had lead blood levels above 20µg/dl which required further testing. Of those retested, 226 children, nearly 1% of those tested, had confirmed lead levels in the blood greater than 20µg/dl — high enough to cause severe and adverse health impacts, such as kidney and liver damage. Another 5,382 tests (13%) found lead blood levels in children ranging from 10 to 19 µg/dl, which can cause decreased intelligence, reduced growth, and learning disabilities. Children with elevated lead levels (above 10µg/dl) receive more frequent testing and an assessment of exposure routes.

Figure 19 Blood Lead Testing in KY Children



**Percentages rounded. µg/dl-micrograms per deciliter of blood. Source: Kentucky Cabinet for Health Services*

The state passed Senate Bill 182 in 1996 to require certification of persons testing and abating lead hazards in homes by July 1, 1997. Beginning January 1, 1997, state regulations will also require all lead-hazard training providers to be accredited.

Federal right-to-know rules, which took effect Dec. 1996, will require home-sellers and landlords to disclose any known lead-based hazards in homes. The rule covers most public and private housing that was built before 1978. To learn more about the federal Lead Hazard Abatement rule you can call 1-800-424-LEAD toll free.

References

1. Inform (1995). Toxics Water 1995: Toxic Chemicals in the Environment: A Far-Ranging Problem. Executive Summary, p. 1.
2. Ibid.
3. Cheryl Simon Silver & Dale S. Rothman (1995). Toxicity and Health, The Potential Long-Term Effects of Industrial Activity, p. 8.
4. Facilities required to report to TRI include those that conduct manufacturing operations within Standard Industrial Classification (SIC) codes 20-39, have 10 or more full-time employees, and process more than 25,000 pounds or use more than 10,000 pounds of TRI listed chemicals.
5. U.S. EPA (1996). 1994 Toxic Release Inventory Report, p. 214.
6. Environmental Policy Alert (1996). OMB Forces EPA to Revise Proposed Expansion of Toxics Reporting, p. 22 (Sept. 11, 1996).
7. U.S. EPA (1996). 1994 Toxic Release Inventory Public Data.
continued page 16.

1994 Toxic Releases and Transfers Off-Site for Further Waste Management (Pounds)

County	Water*	Land*	POTW**	Air*	Transfers***
Allen	0	0	41	45,656	1,075,921
Anderson	200	0	429	100,912	3,021,507
Ballard	71,500	4,050	0	1,062,155	0
Barren	0	15	668	14,209	1,292,935
Bath	0	0	0	0	1,500
Bell	0	6,174	16,762	35,562	37,755
Boone	755	0	39	397,170	601,042
Bourbon	0	0	107	38,279	2,268,737
Boyd	80,052	16,765	75,765	613,986	7,294,610
Boyle	47	0	88,390	77,571	491,869
Bullitt	0	2,417	0	88,526	129,159
Butler	0	670,790	0	12,110	0
Caldwell	0	0	20	85,882	2,330
Calloway	824	0	918	81,806	126,882
Campbell	1,467	0	0	66,108	2,574,722
Carroll	6,305	22,308	0	243,109	5,116,466
Carter	0	0	0	0	0
Casey	0	0	0	1,250	0
Christian	5	2,380	561	832,126	385,174
Clark	10	0	4,720	29,767	151,520
Crittenden	0	0	0	12,750	700
Daviess	2,577	0	905	441,451	1,391,594
Estill	0	0	0	30,155	0
Fayette	13,000	0	82,557	418,486	525,070
Franklin	0	0	19	98,565	174,689
Fulton	0	0	0	510	18,265
Grant	0	0	81,473	308,476	102,694
Graves	10	410	1,455	11,510	170,572
Grayson	15	0	250	33,050	1,000
Green	0	0	0	35,500	0
Greenup	507	0	53,300	338,765	181,450
Hancock	18,810	262	0	1,535,112	538,335
Hardin	21	190	32,665	278,284	5,054,091
Harrison	10	0	19	75,567	225,452
Hart	0	0	0	1,755	14,092
Henderson	505	21,120	835	274,783	373,906
Henry	0	0	48,003	2,210	49,968
Hopkins	250	250	5,280	985,242	165,521
Jefferson	1,099	13,250	1,307,638	10,446,219	16,511,033
Jessamine	0	0	985	174,248	135,895
Johnson	0	0	0	500	0
Kenton	0	0	11,850	95,013	46,925
Knox	0	0	0	8,155	130,596
Laurel	0	0	278	37,327	42,090
Lewis	0	0	0	11,304	250
Lincoln	5	0	5	10	10
Logan	72	2,250	5	1,346,436	2,358,987
Lyon	0	0	0	112,144	14,172
Madison	233	0	1,037	975,244	5,535,953
Marion	0	0	260	15	67,818
Marshall	177,725	18,156	0	5,099,701	4,861,876
Mason	3,090	23,482	0	6,036	287,106
McCraken	21,260	0	0	539,282	284,361
McCreary	0	0	0	10	0
Meade	0	668	0	261,444	83,121
Mercer	250	0	11	160,509	544,333
Metcalfe	0	0	0	4,960	6,990
Monroe	0	0	3	0	34,103
Muhlenberg	0	0	0	90,380	1
Nelson	0	0	15	314,741	55,530
Nicholas	250	0	0	0	0
Ohio	0	0	0	112,000	69,397
Oldham	5	0	0	119,426	3,064,685
Owen	0	0	0	0	8,298
Pendleton	0	0	0	0	0
Powell	15	0	0	11,400	22,250
Pulaski	1,005	0	750	99,861	22,025
Russell	1	0	0	86	317,463
Scott	500	0	1,775	1,042,713	3,145,151
Shelby	255	0	83	302,168	502,750
Simpson	393	255	653	1,531,000	470,733
Taylor	250	0	6,820	179,697	140,292
Todd	0	0	5	26,700	21,005
Union	0	0	0	228,690	81,503
Warren	0	0	14,733	546,395	229,118
Wayne	0	0	1	7,701	17,930
Webster	0	0	0	15,964	750
Whitley	0	0	100	23,925	2,100
Woodford	14	0	309	2,426,768	313,579
Total	**403,292**	**805,192**	**1,842,497**	**35,066,527**	**71,194,175**

**Reported releases on-site of generation. **Transfers off-site to publicly owned treatment works (POTWs). ***Transfers off-site for further waste management excluding transfers to publicly owned treatment works (POTWs) which are listed separately in this chart.*

Source: Toxic Release Inventory Report

8. Environmental Working Group (1996). Dishonorable Discharge, p. 1.
9. U.S. EPA (1996). Discussion regarding Draft National Sediment Contaminant Point Source Inventory: Analysis of Release Data for 1992.
10. U.S. EPA (1996). 33/50 Program, Office of Prevention, Pesticides and Toxic Substances.
11. Environmental Policy Alert (1996). EPA Eyes Starting New Projects on Women's Health Issues, p. 32, Aug. 28, 1996.
12. KY Natural Resource and Environmental Protection Cabinet (1996). Kentucky Outlook 2000: A Strategy for Kentucky's Third Century, Draft. (Aug. 1996).
13. C.R. Curtis, Ohio State University (1995). The Public and Pesticides, Exploring the Interface, p. 17.
14. Greater Boston Physicians for Social Responsibility, et. al (1996). Generations at Risk: How Environmental Toxins May Affect Reproductive Health in Massachusetts, p. 50.
15. U.S. EPA (1994). Pesticide Industry Sales, Usage, and Market Estimates for 1993 and 1994.
16. Natural Resources Defense Council (1996). News Release, Pesticide Use at All-Time High, May 29, 1996.
17. C.R. Curtis, Ohio State University (1995). The Public and Pesticides, Exploring the Interface, p. 17.
18. KY Agricultural Statistics Service (1996). Kentucky Agricultural Statistics (1995-96), p. 13.
19. Ibid, p. 12
20. 61 FR 33260 (1996). Pesticides and Groundwater State Management Plan Regulation, proposed rule, 61 FR 33260, Vol. 61, No. 124, June 26, 1996; U.S. Environmental Protection Agency.
21. KY Dept. of Agriculture, Div. of Pesticides (1996). Special Projects Branch, Groundwater Endangered Species Report, p. 6.
22. C.R. Curtis, op. cit., p. 13.
23. Ibid.
24. U.S. Government Accounting Office (1994). Food Safety: Changes Needed to Minimize Unsafe Chemicals in Food, GAO/RCED-94-192.
25. Federal Food and Drug Administration (1993). Consumer Report.
26. U.S. Government Accounting Office. Since 1980 the GAO has published 22 reports detailing the shortcomings of the FDA pesticide monitoring program, including Reducing Exposure to Resistance of Canceled Pesticides, GAO/RCED-95-23, Dec. 1994.
27. U.S. EPA (1996). Major Issues in the Food Quality Protection Act of 1996, Aug. 1996.
28. KY Division of Water, Water Quality Branch, Bioassay Section (1994). Diazinon, Biomonitoring and Water Quality in KY, p. 128.
29. KY Natural Resources and Environmental Protection Cabinet (1996). Kentucky Outlook 2000: A Strategy for Kentucky's Third Century, Draft, Aug. 1996.
30. U.S. Consumer Product Safety Commission (1996). Press Release #96-150, CPSC Finds Lead Poisoning Hazard for Young Children in Imported Vinyl Mini-blinds, June 25, 1996.
31. Greenwire (1996). Lead: Despite Precautions, Children Still Endangered, p. 6, March 21, 1996.
32. Ibid.

Acknowledgments

Prepared by Leslie Cole, Executive Director, Environmental Quality Commission and Erik Siegel, Research Assistant with the assistance of Scott Richards, Assistant Director. EQC would like to thank Kay Harker, Alex Barber, Gayla Stewart, Michelle Nihei, John Purdy, Leah MacSwords, Joe Schmidt, and other KY Department for Environmental Protection staff for their assistance in providing information for this report. EQC also extends its appreciation for data used in the report to John McCauley and Ernest Collins, KY Dept. of Agriculture; David Klee, Brenda Haydon, and Ann Johnson, KY Cabinet for Health Services; and Henry Spiller, KY Regional Poison Center. EQC extends its appreciation to those who reviewed the report including Jonathan Miller, DuPont; Tom FitzGerald, KY Resources Council; Laura Knoth, KY Farm Bureau; William Quisenberry, Ag/Gro Fertilizer Co.; Deanna Wheeler, Dow Corning; Dr. Monty Johnson, Univ. of KY, School of Agriculture; Sarah Lynn Cunningham, Louisville/Jefferson Co. MSD; Russ Barnett, Univ. of Louisville; Tony Littrell, KY Turfgrass Council; Jim Lacy, KY Conservation Districts, and Cam Metcalfe, KY Pollution Prevention Center. EQC would like to thank Maleva Chamberlain for her assistance with editing the report. EQC welcomes comments or corrections to refine and update information in future editions. Any opinions, findings, or conclusions in this publication are those of EQC and do not necessarily reflect the views or policies of the individuals, agencies, or organizations mentioned above. EQC does not discriminate on the basis of race, color, national origin, sex, age, religion, or disability and provides reasonable accommodations upon request.

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Printed on recycled paper with state funds. Partial funding was also provided by the State Environmental Goals and Indicator Project, a cooperative agreement between the U.S. EPA and the Florida Center for Public Management to encourage the development and use of environmental indicators.